

The Recycling & Reuse-Related Economy of Austin

An Update to the 2015 Austin Recycling Economic Impact Study



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austintexas★gov



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Summary

Much has changed since TXP first examined the economic development implications of what is now being referred to as the circular economy in Austin five years ago. At that point, the focus was almost entirely on recycling; today, reuse and reduction are assuming a greater role in achieving the environmental and economic benefits associated with consuming fewer net resources. This broadened view is known as the circular economy. While the focus has expanded, this updated report is once again based on evaluation of data, industry and overall economic trends, input from local stakeholders, and literature review.

Key Recent Trends:

- Demand for recycled materials is highly dependent on end-use markets, and traditionally, therefore, the economic cycle. However, while end-user recycling rates are up, the use of recycled material has declined.
- In the aftermath of China's recyclable scrap import bans and tightened contamination standards — as well as subsequent restrictions from other Southeast Asian countries — domestic market development has become a priority.
- Reuse and reduction are increasingly important, due at least in part to the combination of environmental benefits and economic independence from commodity market cycles.

Key Finding:

Using a broader definition that includes recycling, reuse, and reduction, total direct Austin recycling & reuse-related economy employment rose from 3,057 in 2013 to 3,156 in 2018, while direct payroll climbed from \$127.8 million to \$165.8 million. Among individual sectors, the strongest job growth was seen in recyclable material merchant wholesalers, used merchandise stores, and solid waste collection. This translates into a 2018 economic impact (including the multiplier effects) of over \$1.1 billion in total economic activity, \$616.2 million in value-added, about \$304 million in labor compensation, and approximately 6,300 permanent jobs. While over a billion dollars in annual activity, the circular economy is in its infancy in Austin; the expectation is that it will grow to many multiples of that figure.

Key Recommendation:

Adapt the Elements of the RESOLVE framework that make sense at the municipal level.

The Ellen MacArthur Foundation has provided an extensive toolkit for policymakers to move toward economic circularity, including the RESOLVE framework that outlines six general areas where action can be taken, *which includes Regenerate, Share, Optimize, Loop, Virtualize and Exchange*. While some may not apply at the municipal level, many could, especially around regeneration and sharing. In general, cities can use procurement, direct program spending, incentives, and the regulatory regime to achieve policy objectives.

In particular, financial incentives are likely to have the most impact in the near term; the City should look to create specific loan and grant programs (perhaps in partnership with philanthropy) to incentivize and enable circular economy firms and practices.



Overview

Much has changed since TXP first examined the economic impact and development implications of what is now being referred to as the circular economy in Austin five years ago. At that point, the focus was almost entirely on recycling; today, reuse and reduction are assuming a greater role in consuming fewer net resources. In light of this evolution, the City of Austin commissioned TXP, Inc. to update the evaluation of the recycling and reuse sectors' current local economic impact. The report that follows provides a context for continued discussion of the economic impact of the recycling, reuse, and related sectors (collectively referred to as Austin's recycling & reuse-related economy), as well as a strategic and tactical direction to support growth in this area.

The Movement Toward the Idea of Economic Circularity

Recent Key Industry Trends

The following analysis is drawn from both a range of secondary sources, including industry publications, public sector data, and popular media, and direct interaction with local stakeholders in both the recycling and reuse elements of the local circular economy. These findings represent the overall market environment and context for evaluating both the existing status and future opportunities related to the circular economy in the Austin area.

Demand for recycled materials is highly dependent on end-use markets, and traditionally, therefore, the economic cycle. However, while end-user recycling rates are up, the use of recycled material has declined.

After decades of education and effort, recycling rates have increased across the United States. Many public spaces across the country have systems to collect plastic bottles, aluminum and paper, and some cities even levy fines for improper recycling. But markets are shifting, causing an increased interest for domestic market development.

For decades, the bulk of U.S. recycling material went to China, where it was made into goods such as shoes and bags and new plastic products. But in 2018 to combat the negative impact of contaminated source materials on processing facilities, China restricted imports of certain recyclables because of the cleanliness of the loads, including mixed paper and some plastics. For municipalities and processors dependent on the Asian market, many are being faced with choosing between higher costs to reduce contamination or dispose of it via landfill or incineration. The United States still has a fair amount of landfill space left, but it's become expensive to ship to those at a distance. As a result, some dumps are raising costs; according to one estimate, along the West Coast, landfill fees increased by \$8 a ton from 2017 to 2018. Some of these costs are already being passed on to consumers, but most haven't, at least at this point. While Austin is less dependent on Asian markets (having a stronger Latin American customer base), these trends are nevertheless having a local impact.

Increased contamination is a huge challenge

Many American cities are working to determine how to handle the recycled material previously sent to China, but few businesses want it domestically for the same reason it's been restricted overseas: contamination. As a result of advancements in packaging technologies and confusion, about 25 percent of what ends up in the recycling is contamination, according to the National Waste & Recycling Association. For decades, this situation was masked by sending it to China, where low-paid workers sorted and cleaned the materials. This is no longer an option, as the Chinese have limited the level of contamination permitted in foreign-sourced recycled materials. Meanwhile, in the United States, when environmental externalities are excluded, the cost of virgin plastics and paper appear cheaper in comparison to employ people to sort recycling.

In the aftermath of China's recyclable scrap import bans and tightened contamination standards — as well as subsequent restrictions from other Southeast Asian countries — domestic market development has become a priority. However, the value proposition must make sense, as companies and consumers will recycle only if the combination of cost, and environmental concern, creates sufficient return to justify the expense.

Bans on plastic increase demand for product substitutes that contain recycled materials

Between prohibitions on Styrofoam, plastic shopping bag bans, and even bans on plastic bottles in some communities, the push to phase-out plastics like these will continue. In the future, look to bioplastics and hybrids (e.g., the convergence of plastic and paperboard in food containers) to assume a growing role. The declining use of traditional plastics will lead to a more complex recycling process and marketplace. For example, is current composting infrastructure equipped to process an increase in bioplastics and can recycling machinery advance quickly enough to detect these new types of products? Collaboration is crucial to advancing modern recycling end markets, and government, private industry, nonprofits and even the public all have a role in the recycling industry's future.

Reuse and reduction are increasingly important

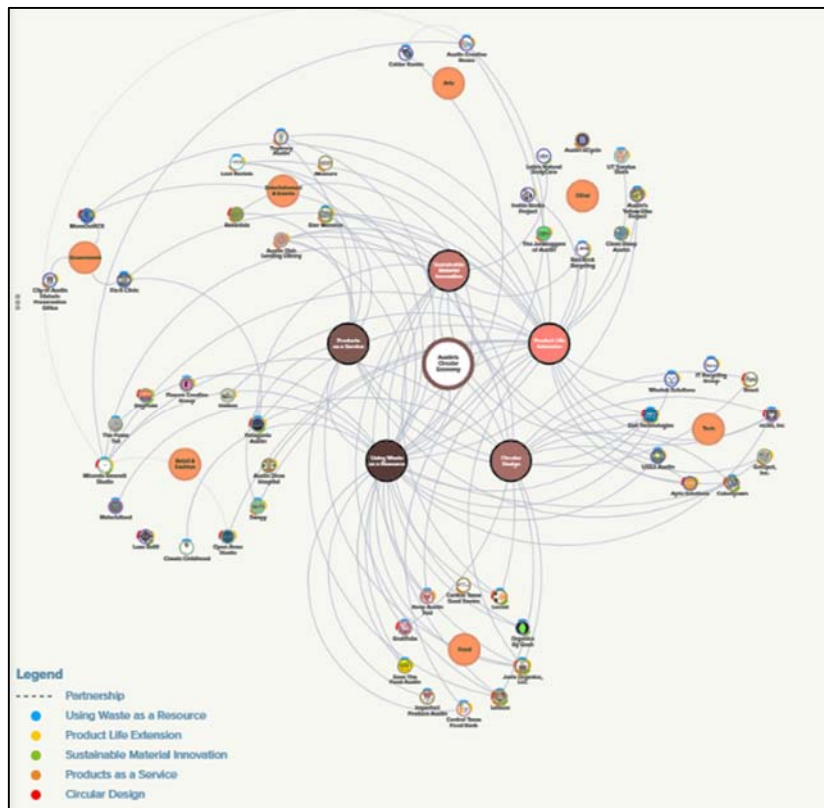
Recalibrating the effort to increase resource efficiency in the economy is likely to be through a heightened emphasis on reuse and reduction, which would reduce upstream waste created when products are made. This will be challenging in the United States' current economic system, where consumer spending accounts for about two-thirds of GDP. The strong economy means more people have more spending money. These resources enable spending on "disposable" items, a key element of many business models. As an example, the average American spent 7 percent more on food and 8 percent more on personal-care products and services in 2017 than in 2016, according the U.S. Census Bureau. Given this strong capacity to spend, consumer education (and associated investment) as to the benefits of reuse and reduction assumes a high level of importance.

The Concept of the Circular Economy

Some of the trends outlined above align with the idea of the circular economy, which broadens the focus from recycling to include activities such as reuse and reduction. The following principles are the foundation upon which economic circularity is based:

1. *Product Life Extension*: Using repair, refurbishment, donation, or other reuse to maintain products or find a second product user.
2. *Circular Design*: Designing products for disassembly, modular and flexible design, designing out waste, redesigning supply chains or using the cradle-to-cradle model of material use.
3. *Products as a Service*: Renting, sharing and leasing products to replace single-user ownership.
4. *Using Waste as a Resource*: Using recovered materials as feedstock, or processing recovered materials like recyclables or organic waste.
5. *Sustainable Material Innovation*: Making materials that can be more easily recovered instead of landfilled by making them more durable, recyclable, compostable, or biodegradable or reducing material toxicity.

Figure 1: Austin Recycling & Reuse-Related Economy EcoSystem Map



Source: <https://kumu.io/ARRCircularEconomy/austins-circular-economy-story>

The City of Austin has built upon this framework constellation to translate the local circular economy to the following major sectors:

- Arts
- Entertainment & Events
- Retail & Fashion
- Food
- Technology
- Government
- Transportation/Other

The following are example firms that fit into each sector listed above.

Arts

Austin Creative Reuse

Austin Creative Reuse is a retail store that collects, distributes, and sells reusable materials donated from industry and individuals. From 'how-to' workshops to anything crafty, Austin Creative Reuse serves as an important access point to educate the community on conservation and reuse through creativity, volunteerism, and relationship building.

#1 Product Life Extension

Austin Creative Reuse resells items that are considered "leftovers" or waste, extending the items' lives, and gives crafters and DIY enthusiasts a wide selection to choose from.

#4 Using Waste as a Resource

By thinking outside the box, beyond an item's intended purpose, Austin Creative Reuse sparks awareness and creativity of its reuse potential. We also strive to inspire our community of creative reuse through social media, workshops and reuse challenges.

Retail & Fashion

Luxe Refill

Luxe Refill makes personal care products such as shampoos, deodorants, moisturizing lotions, etc. that come in refillable aluminum containers that can be returned to the company and filled up for reuse.

#1 Product Life Extension

Takes back the bottles used to dispense products, after they have been used, and refills them, thereby extending the life of these containers.

#2 Circular Design

Luxe Refill uses refillable aluminum packaging for their products. When a customer receives a refill, they can return the empty bottles in the same box the refill came in. They then sanitize the bottle, refill it and ship it out again. They also use compostable/recyclable shipping materials and are a zero-waste company that does not send anything to the landfill ever.

#5 Sustainable Material Innovation

The product ingredients are natural and plant-based, and never include parabens, artificial colors, or synthetic fragrances.

Entertainment & Events

Toybrary Austin

Toybrary Austin is a toy lending library and kids' birthday party venue that also offers drop-in childcare. Seeing a problem in the abundance of unused toys, Toybrary prides itself in reusing toys and renting them out to parents and children.

#3 Products as a Service

Using donated toys to be reused for children to play with and eventually returned.

#4 Using Waste as a Resource

In the kid's area a majority of art projects are made of recycled materials.

Food

Imperfect Produce

Imperfect Produce is a grocery delivery service on a mission to reduce food waste and build a more sustainable food system. They work directly with farmers to purchase produce that cannot be sold at conventional grocery stores due to surplus, sizing, shape, coloration, and overall aesthetic imperfections. Imperfect Produce then company packages the food in boxes and delivers directly to customer's homes.

#4 Using Waste as a Resource

The products that Imperfect Produce buys from farmers and food purveyors would often times go to waste in a landfill. Selling the "ugly" foods directly to customers turns what would otherwise be waste into a nutritious resource.

Technology

Dell Technologies

Dell Technologies is an information technology innovator with efforts focused on circular and sustainable practices.

#1 Product Life Extension

Support services for customers and transparent manufacturing makes it easy for Dell's products to be repaired with minimal cost.

#2 Circular Design

Products are designed with repair, reuse and recycling in mind from the start to make it easy to extend the life cycle and reduce waste.

#3 Products as a Service

Leasing and loyalty programs manage equipment throughout the life cycle; virtualization and cloud services increase utilization while reducing the need for more equipment.

#4 Using Waste as a Resource

Using ocean-bound plastics for packaging and reclaimed carbon fiber waste from the aerospace industry in products only scratch the surface of Dell's efforts.

#5 Sustainable Material Innovation

Using closed-loop processes in manufacturing, recycled materials from previous products are reused.

Government

MoveOutATX

MoveOutATX brings donation stations around West Campus for students moving out at the end of July. Partner reuse organizations accept a wide range of items including furniture, small appliances, clothing and unopened food, that would otherwise be left on the curb or thrown away. Since 2018, the program has kept thousands of pounds from local landfills and re-circulated functional items back into the economy.

#1 Product Life Extension

Partner organizations accept and reuse by giving to those in need or selling donated items to support various social missions. MoveOutATX extends the usefulness of objects that would otherwise be discarded.

#2 Circular Design

Partner organizations accept and reuse by giving to those in need or selling donated items to support various social missions. MoveOutATX extends the usefulness of objects that would otherwise be discarded.

Transportation/Other

Austin's Yellow Bike Project

Austin's Yellow Bike Project is a repair facility for all things bike-related. They educate the community not only how to repair bikes but also re-purposing them and reusing old bike parts. Bikes are tricky to recycle, so Austin's Yellow Bike Project helps make sure that commercial recycling is used as a last resort for cycling equipment.

#1 Product Life Extension

By using donated bikes and recombining salvaged parts, materials that would have otherwise ended up in the landfill are used to repair bikes to continue useful life of the equipment.

#4 Using Waste as a Resource

Bikes on their last leg of life are used as parts for new bike builds instead ending up in the landfill.

The translation of the activity illustrated above is reflected in the data that measures the local circular economy. The following is the quantification of the direct and total impacts.

Modeling Austin's Recycling & Reuse-Related Economy

From a macroeconomic perspective, the move to economic circularity primarily influences the economy through the lowering of costs of production of certain goods and the mitigation of certain social/environmental costs associated with waste. When viewed from a regional point of view, the picture broadens to include activity associated with recycling/reuse/reduction itself, and the downstream production sector that can use recycled materials as inputs. First-stage products are often converted into finished products (e.g., envelopes, plastic bottles, or metal parts), sometimes at the same facility. Reuse eliminates the cost of production from the equation, creating a high level of net economic benefit (which accrues almost entirely to end-use merchants and buyers), and reduction largely benefits the environment, in that the negative implications of production are not incurred. While remanufacturing eliminates the environmental impacts of extracting virgin resources.

TXP explored a range of new methodologies that have been developed since the original study five years ago, which relied heavily on U.S. EPA calculations from almost twenty years ago. The EPA created an approach that uses volume of material recycled as the driver of the model. However, this fails to capture the reuse element of the equation, which is assuming an increasingly important role. Thus, TXP used the methodology developed by RRS in a 2016 study for the State of Michigan¹ -- an approach which continues to rely on jobs in applicable sectors as the driver of the model, broadened to include circular activity. To conduct the economic analysis, RRS followed the published and peer reviewed methodology incorporated by three statewide reports and one regional report. The four reports are:

- ENVIRON International Corporation for the Colorado Department of Public Health and Environment. *Economic Study of Recycling in Colorado*. November 2014.
- SAIC for the Houston---Galveston Area Council. *The Economic Contribution of the Recycling Industry to the Houston---Galveston Region*. May 2013.
- Valentine, David, and Ann Ulmer. *Missouri Recycling Economic Information Study*. Prepared by the University of Missouri Institute of Public Policy for the Environmental Improvement and Energy Resources Authority. January 2005.
- The National Recycling Coalition (with R.W. Beck, Inc.) for the Florida Department of Environmental Protection. *Florida Recycling Economic Information Study*. June 2000.

In order to gather a complete picture of the RRR (recycle, reuse, reduce) industry in Michigan, the economic study included the impacts of both supply and demand side activities in the state. On the supply side, the study included the impacts of all activities

¹ https://www.michigan.gov/documents/deq/deq-wmrpd-Updated_End_Use_Market_Analysis_Report_v12_-_030517_555772_7.pdf

involved in collecting, processing, selling, and using recovered items in the state. On the demand side, the study included all activities up to the first point in which the materials are used or products have been completed. RRS reviewed the North American Classification System (NAICS) information from the 2012 U.S. Economic Census as well as the NAICS codes and businesses identified in other state studies to identify the businesses involved in RRR in Michigan.

The following business activities were considered in the research:

- Businesses and organizations involved in the collection and transportation of RRR materials, including both private and public sector collectors;
- Intermediate processing of recovered scrap materials or reused products and items, including activities such as sorting and cleaning as well as disassembling, consolidating, composting and densifying;
- Reclaiming materials used for manufacturing inputs;
- Manufacturing of products using recovered materials; and
- Wholesale/retail establishments selling used, recovered or reclaimed materials.

It should be noted that concept and reality of economic circularity is ahead of the capacity to measure it. This is not unusual; as the role of information and knowledge as a component of adding economic value accelerated during the 1990s the measurement process struggled to catch up, so much so that “Information,” which is now a major industry sector under the modern NAICS (North American Industrial Classification System) used by the federal government did not exist under the old SIC (Standard Industrial Classification) system that was previously in place. As stated above, for these purposes, TXP largely relied upon the methodology developed by RRS for Michigan, but we recognize that it likely understates the impact of a significant degree. If this analysis is updated in future years, presumably at the point when measurement has caught up to real-world activity, the expectation would be that the result reported here would increase.

Estimates of Direct Presence in Austin

Direct Recycling & Reuse-Related Economy Activity Data

The best source of data that describes the current footprint of direct recycling activity in Austin is the Quarterly Census of Employment and Wages (QCEW), maintained by the Texas Workforce Commission (TWC). Data was selected by NAICS codes (a classification system which allocates establishments based on their primary economic activity) associated with recycling, reuse and recovery as defined by RRS in their Michigan study. Only those NAICS that are present in the local Austin economy were included, and these figures do not include local public sector workers (such as those at Austin Resource Recovery). Using information on the share of activity associated with recycling, reuse and recovery from the RRS Michigan

study, the adjusted figures for employment and payroll, along with estimates on annual receipts, are presented in Table 1.

Table 1: Austin MSA Direct Recycling and Reuse-Related Activity (2013 & 2018)

NAICS	Industry	2013		2018	
		Employment	Employment	Payroll	Receipts
3219	Wood Container and Pallet Manufacturing	89	78	\$3,944,462	\$19,220,914
3222	All Other Converted Paper Product Manufacturing	60	319	\$27,609,806	\$128,743,289
32615	Urethane and Foam Product Manufacturing	64	106	\$6,473,335	\$47,804,090
32629	Other Rubber Product Manufacturing	46	41	\$1,535,274	\$9,404,407
327215	Glass Product Mfg. (Using Purchased Glass)	30	18	\$536,796	\$2,757,143
3311	Iron and Steel Mills and Ferroalloy Manufacturing	76	59	\$2,557,802	\$30,907,154
42314	Motor Vehicle Parts (Used) Merchandise Wholesaler	172	28	\$959,199	\$6,719,399
42384	Industrial Supplies Merchant Wholesalers	36	124	\$14,742,846	\$49,166,892
42393	Recyclable Material Merchant Wholesalers	501	491	\$28,902,864	\$96,390,071
4533	Used Merchandise Stores	1,044	1,117	\$32,541,561	\$98,436,427
562111	Solid Waste Collection	447	599	\$34,726,069	\$162,122,984
562112	Hazardous Waste Collection	30	25	\$1,520,191	\$7,097,202
562920	Materials Recovery Facilities (MRFs)	102	70	\$3,072,069	\$21,583,995
811211	Consumer Electronics and Repair	56	50	\$1,657,500	\$4,860,239
81143	Footwear and Leather Goods Repair	30	33	\$1,044,615	\$3,558,773
Total		2,670	3,156	\$161,824,391	\$688,772,980

Source: TWC, RRS, TXP

In comparison to 2014 (the last time this study was done), total direct Austin recycling and reuse-related employment rose from 2,670 to 3,156, while direct payroll climbed from \$74.5 million to \$165.8 million. Among individual sectors, the strongest job growth was seen in recyclable material merchant wholesalers, used merchandise stores, and solid waste collection, reflecting the growing role of reuse and reduction.

Economic Impact Methodology

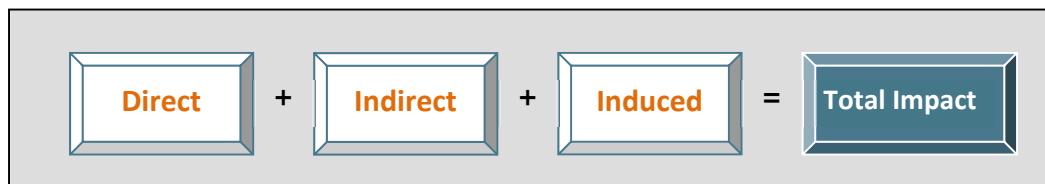
In an input-output analysis of economic activity, it is useful to distinguish three types of expenditure effects: direct, indirect, and induced. Direct effects are production changes associated with the immediate effects or final demand changes. The purchase of collected and processed recycled materials from a materials recovery facility (MRF) is an example of a direct effect.

Indirect effects are production changes in backward-linked industries caused by the changing input needs of directly affected industries – typically, additional purchases to produce additional output. For example, a MRF needs to purchase and maintain vehicles, equipment, and other supplies in order to collect and process recyclable commodities. These downstream purchases affect the economic status of other local merchants and workers.

Induced effects are the changes in regional household spending patterns caused by changes in household income generated from the direct and indirect effects. The MRF and its owners see increased revenue from increased collection and resale of recycled materials, as do the establishments that provide the necessary supplies or maintain and repair the MRF's equipment. Induced effects capture the way in which this increased income is in turn spent in the local economy.

Once the indirect and induced effects have been calculated, the results can be expressed in a number of ways. Four of the most common are “Output,” equivalent to sales or receipts; “Value Added,” which is sales minus cost of goods sold; “Earnings,” which represents the compensation to employees and proprietors; and “Employment,” which refers to permanent, full-time jobs that have been created in the local economy.

Figure 2: The Flow of Economic Impacts



Results

In 2018, Austin's recycling & reuse-related economy (including the indirect and induced effects) accounted for over \$1.1 billion in total economic activity, \$616.2 million in value-added, about \$304 million in labor compensation, and approximately 6,300 permanent jobs. Within broad groups, the combination of Recycled Material Wholesalers (NAICS 42393), Used Merchandise Stores (NAICS 4533) and Solid Waste Collection (NAICS 562111) account for 53.5 percent of the Output/Receipts and 68.4 percent of the jobs attributable to the circular

economy in Austin. Manufacturing sectors (NAICS 3219-3311), by contrast, represent slightly less than one-third of the Output/Receipts and about 21 percent of the jobs. See Appendix 1 for additional detailed results.

Table 2: Total Economic Impact of Austin MSA Recycling & Reuse-Related Economy by Sector (\$2019)

NAICS		Output/Receipts	Value-Added	Earnings	Employment
3219	Wood Container and Pallet Manufacturing	\$30,379,056	\$13,139,136	\$7,404,545	137
3222	All Other Converted Paper Product Manufacturing	\$252,272,474	\$108,772,662	\$54,101,415	686
32615	Urethane and Foam Product Manufacturing	\$67,731,529	\$27,071,767	\$13,270,985	223
32629	Other Rubber Product Manufacturing	\$15,288,871	\$6,110,843	\$2,995,627	89
327215	Glass Product Mfg. (Using Purchased Glass)	\$4,293,316	\$2,035,482	\$1,047,396	41
3311	Iron and Steel Mills and Ferroalloy Manufacturing	\$34,555,553	\$12,847,227	\$6,894,300	130
42314	Motor Vehicle Parts (Used) Merchandise Wholesaler	\$5,693,393	\$3,695,463	\$1,707,182	68
42384	Industrial Supplies Merchant Wholesalers	\$87,507,235	\$56,799,126	\$26,239,318	307
42393	Recyclable Material Merchant Wholesalers	\$171,555,049	\$111,352,814	\$51,441,317	1,212
4533	Used Merchandise Stores	\$165,983,504	\$110,022,500	\$54,871,580	1,559
562111	Solid Waste Collection	\$272,666,180	\$143,582,611	\$72,712,916	1,544
562112	Hazardous Waste Collection	\$11,936,413	\$6,285,566	\$3,183,128	66
562920	Materials Recovery Facilities (MRFs)	\$24,121,628	\$12,702,149	\$6,432,605	180
811211	Consumer Electronics and Repair	\$6,637,603	\$4,190,153	\$2,657,138	96
81143	Footwear and Leather Goods Repair	\$6,394,547	\$4,117,901	\$1,762,057	57
Total		\$1,141,727,480	\$616,211,118	\$303,725,883	6,304

Source: TXP

Table 3: Total Economic Impact of Austin MSA Recycling and Reuse-Related Economic Activity by Industry (\$2019)

	Output/Receipts	Value-Added	Earnings/Payroll	Jobs
Agriculture, etc.	\$223,614	\$99,838	\$71,628	3
Mining	\$3,692,080	\$2,367,280	\$626,129	6
Utilities	\$13,646,077	\$8,010,879	\$2,103,616	18
Construction	\$6,027,262	\$3,549,754	\$1,944,414	31
Durable Manufacturing	\$61,761,960	\$20,688,947	\$11,982,905	213
Nondurable Manufacturing	\$221,156,197	\$74,442,247	\$36,867,662	472
Wholesale Trade	\$189,781,447	\$129,154,912	\$56,810,522	786
Retail Trade	\$126,792,208	\$81,082,929	\$42,619,070	1,383
Transportation/Warehousing	\$16,943,567	\$9,483,559	\$5,942,029	127
Information	\$28,456,056	\$16,693,013	\$6,021,185	94
Finance & Insurance	\$50,046,775	\$25,662,907	\$13,178,022	233
Real Estate	\$77,932,603	\$57,137,043	\$12,694,228	469
Prof./Technical Services	\$39,560,885	\$26,730,607	\$17,846,626	258
Management of Companies	\$7,413,473	\$4,783,026	\$3,301,406	35
Admin./Waste services	\$203,824,628	\$101,287,863	\$54,465,038	1,107
Educational Services	\$5,193,633	\$3,217,185	\$2,467,639	78
Healthcare & Social Services	\$33,608,767	\$19,919,848	\$14,821,558	303
Arts, Entertainment, etc.	\$4,433,263	\$2,426,803	\$1,419,634	73
Accommodation	\$6,130,891	\$3,890,198	\$1,720,840	48
Food Services, etc.	\$15,533,879	\$8,134,426	\$5,060,967	233
Other Services	\$29,568,216	\$17,447,855	\$11,357,325	297
Households	N.A.	N.A.	\$403,440	36
Total Annual	\$1,141,727,480	\$616,211,118	\$303,725,883	6,304

Source: TXP

Discussion & Recommendations

City-Led Efforts to Date

Austin is embracing circular economy principles as part of the effort to achieving its zero waste by 2040 goal. The city's Material Marketplace is one measure, amongst a package of policy initiatives, that has helped to find new solutions that avoid valuable materials being sent to landfill and has provided opportunities for entrepreneurs and businesses. The Universal Recycling Ordinance mandate is another, compatible measure, as is the compilation of the Recycling and Reuse Enterprise Resource Guide. Each of these efforts are managed by the City's Resource Recovery department (often in partnership with the Economic Development Department).

The City of Austin's spirit of collaboration has also played a key role. The city has a history engaging with local businesses to promote the economic benefits of working in different ways, through programs such as the Austin Energy Green Building Program and the Green Business Leaders Program.

Programs Supporting Zero-Waste Related Businesses and Entrepreneurs

- **ATI Circular Economy Incubator:** Connects entrepreneurs with academia, industry, and government to solve global challenges in design and reuse. Helps businesses test circular economy technology and business model innovations.
- **Austin's Circular Economy Story Mapping:** A digital, interactive online tool that visually maps relationships of local businesses in the circular economy sector by five principles: product life extension; circular design; using waste as a resource; sustainable materials innovation; and products as a service.
- **Business retention and expansion efforts:** Includes visits to local businesses working in the circular economy sector (e.g. reuse, thrift, recyclers, remanufacturers, up-cyclers) to understand challenges and provide resources, and a monthly newsletter to our community with upcoming opportunities, news and events.
- **Enterprise Resource Guide:** Updated biannually, this guide provides resources for entrepreneurs in the recycling and reuse sector, and includes information such as free Small Business trainings and classes, local funding options, how to do business with the City of Austin, and Zero Waste Ordinances to be aware of.
- **Material Focus:** A 1-2 year project to identify and implement a solution for a hard-to-recycle material through information gathering and bringing together multiple industries. The current material is textiles.
- **[Re]Verse Pitch Competition:** Annual competition for social entrepreneurs to create or expand a business idea using raw materials that local businesses, non-profits, and institutions are generating as byproducts. Since its inception in 2016,

the program has diverted 9.5 million lbs. of material. February 2020 marks the opening of the fifth competition.

- Austin Materials Marketplace: By the end of 2018 the Materials Marketplace had engaged with over 530 participants on the platform. At the point at which 593 trades had been made, a net value of \$622,772 had been generated. This includes the amount paid for each trade, in addition to the sellers' estimated disposal cost savings, and the amount the purchasers saved by not having to buy a new item. The trades have resulted in over 400 tons of material diverted from a landfill and over 950 metric tons of carbon dioxide equivalent emissions saved.

Programs focused on Supporting Behavior Change Among Residents:

- Fix-It Clinics: Quarterly community repair events in partnership with Austin Public Library. Residents can bring in broken items free-of-charge and learn how to repair them alongside skilled volunteer coaches. In spring 2019, launched a Fix-It Clinic Partnership Program to expand community access to repair through partnership clinics with local businesses, with City marketing assistance. Since 2015, the program has kept over 2,000 lbs. out of the landfill; currently 3 partnerships formed.
- MoveOutATX: A community-led effort to keep reusable items out of the landfill at the end of summer during off-campus student move-out at The University of Texas. Reuse organizations set up convenient outlets in and near apartment complexes for students to donate items. Since 2018, program has kept nearly 2,000 cubic yards, 152 tons of material out of the landfill, and provided an estimated \$350,000 in economic value to the community.
- Reuse Directory: An online searchable directory to inform residents of businesses or organizations they can donate, resell, buy used or upcycled, repair or rent goods and services.
- National Reuse Day/Weekend: October 20 marks National Reuse Day, which has been recognized by the Austin City Council since 2013. In 2018, the City partnered with reuse organizations to offer residents an opportunity to donate items at participating locations of the Austin Reuse Directory in exchange for an 'I Heart Reuse' sticker that was redeemable for discounted shopping at those same locations.
- Give a Great Story Holiday Marketing Campaign: Annual holiday campaign to promote zero waste shopping; includes social media marketing, ad buying and physical tabling at least one local holiday shopping festival.

Recycling & Reuse-Related Economy Program Support

- Challenge Studio: Economic Development pilot to bring together entrepreneurs interested in solving a zero-waste challenge. 9-month incubation period at Huston-Tillotson. Kicking off early 2020.
- STAR Reuse Council & Central Texas Council: Staff serves on State of Texas Alliance for Recycling Reuse Council and Central Texas Regional Steering Committees. Councils plan networking/educational events & webinars to promote reuse and recycling statewide.
- New Plastics Economy: The City is signatory of Ellen MacArthur Foundation's global commitment to reduce plastic waste.

More broadly, greater economic circularity is clearly an economic development focus and goal for the City. Therefore, TXP further recommends:

Primary Recommendation: Adapt the elements of the RESOLVE framework that make sense at the municipal level.

The Ellen MacArthur Foundation created an extensive toolkit for policymakers to move toward economic circularity, the key exhibits of which are included as an appendix to this study. The RESOLVE framework presented in Figure 2 outlines six general areas where action can be taken; while some may not apply at the municipal level, many could, especially around the first two (regeneration and sharing). In general, cities can use procurement, direct program spending, incentives, and the regulatory regime in order to achieve policy objectives. Each should be examined through this lens, with policy adjustments made accordingly.

Figure 2: The RESOLVE Framework: Six Action Areas for Businesses and Countries Wanting to Move Toward a Circular Economy



SOURCE: Ellen MacArthur Foundation, SUN and McKinsey Center for Business and Environment, *Growth Within: A Circular Economy Vision for a Competitive Europe* (2015). Based on S. Heck, M. Rogers, P. Carroll, *Resource Revolution* (2015).

Tactic #1

Identify meaningful financial incentives to promote all elements of circularity. Just as factors such as location in the Desired Development Zone and employing traditionally hard-to-serve populations are included in the Chapter 380 economic incentive evaluation done by the City, the use of recycled or reused materials (by any type of production firm) is also be part of the equation, either as a core consideration or as a means to receive bonus points. By the same token, firms that sell used goods (perhaps of certain types) could also conceivably qualify, while the City could explore modifying its resource recovery fee structure to more greatly incentive consumers to consume less overall.

In particular, financial incentives are likely to have the most impact in the near term; the City should look to create specific loan and grant programs (perhaps in partnership with philanthropy) to incentivize and enable circular economy firms and practices.

Tactic #2

Consider providing regulatory incentives to developers/builders who meet to-be-determined targets related to the use of recycled or reused building materials. The old adage that time is money is certainly true in the development world in Austin, as compliance often is time-consuming. The City could consider expediting the process, based on certain criteria, which could also be combined with financial incentives, such as reduction or elimination of impact fees.

Tactic #3

Stimulate circular economy industry by developing City of Austin circular roadmap.

Strategies could include:

- Auditing the city's procurement and departmental purchasing process, in order to identify solutions that use fewer new products and prioritize products as a resource or for reuse.
- Analyzing waste and byproduct streams, identifying stakeholders and barriers to diversion, and testing solutions.
- Leveraging the City's buying power to promote end-markets for recycled and used products by including a matrix tool for evaluating the cost effectiveness and economic benefit for locally-made recycled content or secondhand products in the City of Austin's purchasing process. Just as the City helped jump-start the market for renewable energy, it is a large enough customer to make a difference with its purchasing decisions.

Tactic #4

Work on developing end-use markets locally for products made from recycled or reused materials with a focus on the sectors that require upstream packaging. A clear example is in the food and beverage sector, as Austin is home to a broad and growing range of packaged food and drinks, and glass and plastic (which are typically used in food/beverage packaging) are relatively available locally. Given the volume of local food and beverage production that uses packaging materials made elsewhere and larger than normal “raw material,” this is an area of opportunity. Austin has been working to get food & beverage production to locate locally for years, as relatively high costs for both labor and real estate (in comparison to competitors) have been substantial barriers. A joint regional focus could help address these issues, especially if other public sector jurisdictions (e.g. Travis County) participated financially.

Tactic #5

Focus on business, government, not-for-profit, and consumer education efforts connecting the circular economy and overall economic development. Austin’s commitment to zero landfill waste by 2040 and its Universal Recycling Ordinance provide an excellent opportunity to raise local business and community awareness of the economic development opportunities associated with moving toward economic circularity. In the process, the City should expand its role as a catalyst for consumer awareness and acceptance of economic circularity by leading by example. That obviously has already happened with Austin Resource Recovery and related departments; to the extent that the entire City of Austin can embrace this mindset and approach across all departments the opportunity to influence not only business and consumers but other public sector jurisdictions and not-for-profits as well can only increase. To the extent that happens, the investment that the City has made is substantially leveraged.

Conclusion

Consciousness on the circular economy continues to grow, with common terms such as “carbon footprint” and “sustainability” now being seen in the larger context of climate change and the potential for a range of unforeseen and unwelcome outcomes. While this remains the primary focus for many, the lens continues to broaden to include the economic impacts as well. As the global market for recycled materials has shrunk, the focus is turning toward local circularity, with greater emphasis on reuse and reduction. At the same time, consumers are increasingly evaluating not only the product itself, but how and where it was made (and by whom) in making their purchasing decisions, making a product’s “green” quality a factor in the overall value proposition. The combination of environmental and economic benefits is powerful, and points to a range of economic development opportunities

in Austin that can build on the investments and program commitments already made by the City.

Appendix 1: Detailed Economic Impacts by Recycling & Reuse-Related Sector

This Appendix includes a detailed breakdown of the total economic impact of each recycling & reuse-related sector by industry. It is important to note that specific activities important to the Austin economy are found within each of these NAICS. The NAICS 56211, for example, includes the collection of all recyclable materials including organics, electronics, construction waste, packaging materials, paper, etc.

A1.1: NAICS 3219: Wood Container and Pallet Manufacturing (\$2019)

	Output/Receipts	Value-Added	Earnings/Payroll	Jobs
Agriculture, etc.	\$19,880	\$10,844	\$7,229	0
Mining	\$66,870	\$45,183	\$10,844	0
Utilities	\$319,894	\$180,731	\$46,990	0
Construction	\$146,392	\$83,136	\$45,183	1
Durable Manufacturing	\$19,551,468	\$6,560,531	\$4,127,894	83
Nondurable Manufacturing	\$401,223	\$168,080	\$74,100	1
Wholesale Trade	\$1,465,728	\$994,020	\$437,369	4
Retail Trade	\$809,674	\$538,578	\$283,748	7
Transportation/Warehousing	\$430,140	\$211,455	\$133,741	2
Information	\$695,814	\$393,993	\$140,970	2
Finance & Insurance	\$1,069,927	\$533,156	\$280,133	4
Real Estate	\$1,574,166	\$1,102,458	\$245,794	7
Prof./Technical Services	\$1,097,037	\$690,392	\$468,093	5
Management of Companies	\$206,033	\$122,897	\$84,944	1
Admin./Waste services	\$487,973	\$316,279	\$209,648	5
Educational Services	\$124,704	\$75,907	\$57,834	1
Healthcare & Social Services	\$806,060	\$486,166	\$361,462	5
Arts, Entertainment, etc.	\$104,824	\$56,027	\$32,532	1
Accommodation	\$144,585	\$92,173	\$39,761	1
Food Services, etc.	\$381,342	\$202,419	\$124,704	4
Other Services	\$475,322	\$263,867	\$180,731	3
Households	N.A.	N.A.	\$10,844	1
Total Annual	\$30,379,056	\$13,139,136	\$7,404,545	137

A1.2: NAICS 3222: All Other Converted Paper Product Manufacturing (\$2019)

	Output/Receipts	Value-Added	Earnings/Payroll	Jobs
Agriculture, etc.	\$32,562	\$16,281	\$16,281	0
Mining	\$781,483	\$504,708	\$130,247	1
Utilities	\$3,728,325	\$2,100,236	\$553,550	3
Construction	\$1,269,910	\$716,359	\$390,741	4
Durable Manufacturing	\$5,340,134	\$2,539,820	\$1,286,191	12
Nondurable Manufacturing	\$165,446,459	\$56,364,460	\$28,084,545	324
Wholesale Trade	\$10,973,323	\$7,440,369	\$3,272,460	26
Retail Trade	\$5,698,313	\$3,793,449	\$2,002,550	41
Transportation/Warehousing	\$4,135,347	\$2,051,393	\$1,302,472	17
Information	\$5,112,201	\$2,914,280	\$1,041,977	10
Finance & Insurance	\$8,645,155	\$4,346,999	\$2,279,325	26
Real Estate	\$11,966,458	\$8,319,538	\$1,856,022	43
Prof./Technical Services	\$7,310,122	\$4,737,741	\$3,174,775	29
Management of Companies	\$2,360,730	\$1,416,438	\$976,854	7
Admin./Waste services	\$4,216,752	\$2,686,348	\$1,742,056	33
Educational Services	\$895,449	\$553,550	\$423,303	8
Healthcare & Social Services	\$5,877,403	\$3,549,235	\$2,637,505	34
Arts, Entertainment, etc.	\$781,483	\$423,303	\$244,213	8
Accommodation	\$1,009,416	\$634,955	\$276,775	5
Food Services, etc.	\$2,751,471	\$1,449,000	\$895,449	27
Other Services	\$3,939,977	\$2,149,078	\$1,449,000	23
Households	N.A.	N.A.	\$65,124	4
Total Annual	\$252,272,474	\$108,772,662	\$54,101,415	686

A1.3: NAICS 32615: Urethane & Foam Product (Non-Polystyrene) Mfg. (\$2019)

	Output/Receipts	Value-Added	Earnings/Payroll	Jobs
Agriculture, etc.	\$8,685	\$4,343	\$4,343	0
Mining	\$286,612	\$186,732	\$47,769	0
Utilities	\$759,955	\$429,917	\$112,908	1
Construction	\$286,612	\$160,676	\$86,852	1
Durable Manufacturing	\$1,311,465	\$581,908	\$290,954	4
Nondurable Manufacturing	\$46,691,633	\$14,304,524	\$6,991,586	111
Wholesale Trade	\$3,304,718	\$2,240,781	\$985,770	10
Retail Trade	\$1,376,604	\$916,289	\$482,029	13
Transportation/Warehousing	\$716,529	\$356,093	\$221,473	4
Information	\$1,194,215	\$677,446	\$238,843	3
Finance & Insurance	\$2,140,902	\$1,081,307	\$555,853	8
Real Estate	\$2,822,690	\$1,967,198	\$438,603	13
Prof./Technical Services	\$1,906,401	\$1,237,641	\$833,779	10
Management of Companies	\$347,408	\$208,445	\$143,306	1
Admin./Waste services	\$885,890	\$568,881	\$373,464	9
Educational Services	\$221,473	\$134,621	\$104,222	3
Healthcare & Social Services	\$1,441,743	\$868,520	\$647,047	11
Arts, Entertainment, etc.	\$195,417	\$104,222	\$60,796	3
Accommodation	\$251,871	\$160,676	\$69,482	2
Food Services, etc.	\$694,816	\$369,121	\$225,815	9
Other Services	\$885,890	\$495,056	\$338,723	7
Households	N.A.	N.A.	\$17,370	1
Total Annual	\$67,731,529	\$27,071,767	\$13,270,985	223

A1.4: NAICS 32629: Other Rubber Product Manufacturing (\$2019)

	Output/Receipts	Value-Added	Earnings/Payroll	Jobs
Agriculture, etc.	\$1,960	\$980	\$980	0
Mining	\$64,696	\$42,151	\$10,783	0
Utilities	\$171,543	\$97,044	\$25,486	0
Construction	\$64,696	\$36,269	\$19,605	0
Durable Manufacturing	\$296,034	\$131,353	\$65,676	1
Nondurable Manufacturing	\$10,539,587	\$3,228,925	\$1,578,193	45
Wholesale Trade	\$745,966	\$505,806	\$222,515	4
Retail Trade	\$310,737	\$206,832	\$108,807	5
Transportation/Warehousing	\$161,740	\$80,380	\$49,992	1
Information	\$269,567	\$152,918	\$53,913	1
Finance & Insurance	\$483,260	\$244,081	\$125,471	3
Real Estate	\$637,159	\$444,051	\$99,005	5
Prof./Technical Services	\$430,327	\$279,370	\$188,207	4
Management of Companies	\$78,420	\$47,052	\$32,348	1
Admin./Waste services	\$199,970	\$128,412	\$84,301	4
Educational Services	\$49,992	\$30,388	\$23,526	1
Healthcare & Social Services	\$325,441	\$196,049	\$146,056	4
Arts, Entertainment, etc.	\$44,111	\$23,526	\$13,723	1
Accommodation	\$56,854	\$36,269	\$15,684	1
Food Services, etc.	\$156,839	\$83,321	\$50,973	3
Other Services	\$199,970	\$111,748	\$76,459	3
Households	N.A.	N.A.	\$3,921	1
Total Annual	\$15,288,871	\$6,110,843	\$2,995,627	89

A1.5: NAICS 327215: Glass Product Manufacturing (Purchased Glass) (\$2019)

	Output/Receipts	Value-Added	Earnings/Payroll	Jobs
Agriculture, etc.	\$505	\$376	\$252	0
Mining	\$57,039	\$33,567	\$9,338	0
Utilities	\$106,506	\$59,310	\$15,900	0
Construction	\$27,762	\$15,648	\$8,581	0
Durable Manufacturing	\$2,664,677	\$1,056,987	\$570,894	19
Nondurable Manufacturing	\$64,106	\$25,743	\$10,853	0
Wholesale Trade	\$166,826	\$113,068	\$49,720	1
Retail Trade	\$110,544	\$73,949	\$38,867	3
Transportation/Warehousing	\$66,125	\$32,558	\$19,686	1
Information	\$88,335	\$50,225	\$17,415	1
Finance & Insurance	\$166,321	\$84,044	\$43,410	2
Real Estate	\$217,808	\$151,936	\$34,072	3
Prof./Technical Services	\$138,812	\$90,606	\$60,825	2
Management of Companies	\$42,148	\$25,491	\$17,415	0
Admin./Waste services	\$75,715	\$48,205	\$31,296	2
Educational Services	\$17,415	\$10,600	\$8,076	1
Healthcare & Social Services	\$113,825	\$68,649	\$51,234	2
Arts, Entertainment, etc.	\$14,638	\$7,824	\$4,543	0
Accommodation	\$18,929	\$11,862	\$5,300	0
Food Services, etc.	\$52,496	\$27,762	\$17,162	2
Other Services	\$82,782	\$45,682	\$31,043	2
Households	N.A.	N.A.	\$1,514	0
Total Annual	\$4,293,316	\$2,035,482	\$1,047,396	41

A1.6: NAICS 3311: Nonferrous Metal Production (\$2019)

	Output/Receipts	Value-Added	Earnings/Payroll	Jobs
Agriculture, etc.	\$4,203	\$3,011	\$2,101	0
Mining	\$1,012,817	\$546,333	\$153,393	2
Utilities	\$624,080	\$348,813	\$92,456	1
Construction	\$205,925	\$115,570	\$63,038	1
Durable Manufacturing	\$21,989,897	\$5,312,036	\$3,315,820	52
Nondurable Manufacturing	\$374,028	\$157,596	\$67,241	1
Wholesale Trade	\$2,250,471	\$1,525,529	\$672,410	9
Retail Trade	\$731,246	\$487,497	\$256,356	9
Transportation/Warehousing	\$645,093	\$319,395	\$184,913	3
Information	\$512,712	\$294,179	\$100,861	2
Finance & Insurance	\$1,042,235	\$516,915	\$279,470	6
Real Estate	\$1,445,681	\$1,010,716	\$224,837	9
Prof./Technical Services	\$865,727	\$550,535	\$376,129	6
Management of Companies	\$128,178	\$75,646	\$52,532	1
Admin./Waste services	\$777,474	\$460,180	\$283,673	8
Educational Services	\$115,570	\$69,342	\$52,532	2
Healthcare & Social Services	\$750,157	\$451,775	\$336,205	7
Arts, Entertainment, etc.	\$92,456	\$48,329	\$29,418	2
Accommodation	\$121,874	\$75,646	\$33,620	1
Food Services, etc.	\$350,914	\$184,913	\$115,570	6
Other Services	\$514,814	\$285,774	\$193,318	5
Households	N.A.	N.A.	\$8,405	1
Total Annual	\$34,555,553	\$12,847,227	\$6,894,300	130

A1.7: NAICS 42314: Motor Vehicle Parts (Used) Wholesalers (\$2019)

	Output/Receipts	Value-Added	Earnings/Payroll	Jobs
Agriculture, etc.	\$1,286	\$643	\$322	0
Mining	\$10,292	\$7,076	\$1,930	0
Utilities	\$62,717	\$35,700	\$9,327	0
Construction	\$32,162	\$18,011	\$9,970	0
Durable Manufacturing	\$43,419	\$18,976	\$9,970	0
Nondurable Manufacturing	\$65,611	\$26,695	\$13,187	1
Wholesale Trade	\$3,385,417	\$2,295,754	\$1,009,579	29
Retail Trade	\$180,110	\$120,287	\$63,360	5
Transportation/Warehousing	\$109,352	\$62,073	\$38,595	2
Information	\$171,426	\$98,417	\$36,022	1
Finance & Insurance	\$284,959	\$143,766	\$74,295	3
Real Estate	\$462,496	\$323,876	\$71,722	6
Prof./Technical Services	\$232,534	\$152,128	\$100,025	3
Management of Companies	\$45,027	\$27,016	\$18,654	0
Admin./Waste services	\$140,228	\$92,628	\$63,360	4
Educational Services	\$28,946	\$17,689	\$13,508	1
Healthcare & Social Services	\$185,577	\$111,925	\$83,301	4
Arts, Entertainment, etc.	\$24,443	\$13,187	\$7,719	1
Accommodation	\$28,625	\$18,333	\$8,041	1
Food Services, etc.	\$79,120	\$41,490	\$25,730	3
Other Services	\$119,644	\$67,541	\$46,314	3
Households	N.A.	N.A.	\$2,251	0
Total Annual	\$5,693,393	\$3,695,463	\$1,707,182	68

A1.8: NAICS 42384: Industrial Supplies Merchant Wholesalers (\$2019)

	Output/Receipts	Value-Added	Earnings/Payroll	Jobs
Agriculture, etc.	\$19,773	\$9,887	\$4,943	0
Mining	\$158,187	\$108,754	\$29,660	0
Utilities	\$963,954	\$548,712	\$143,357	1
Construction	\$494,335	\$276,828	\$153,244	2
Durable Manufacturing	\$667,353	\$291,658	\$153,244	2
Nondurable Manufacturing	\$1,008,444	\$410,298	\$202,677	3
Wholesale Trade	\$52,033,734	\$35,285,654	\$15,517,185	131
Retail Trade	\$2,768,278	\$1,848,814	\$973,841	21
Transportation/Warehousing	\$1,680,740	\$954,067	\$593,202	9
Information	\$2,634,807	\$1,512,666	\$553,656	6
Finance & Insurance	\$4,379,811	\$2,209,679	\$1,141,915	14
Real Estate	\$7,108,542	\$4,977,956	\$1,102,368	27
Prof./Technical Services	\$3,574,044	\$2,338,206	\$1,537,383	15
Management of Companies	\$692,069	\$415,242	\$286,714	2
Admin./Waste services	\$2,155,302	\$1,423,686	\$973,841	19
Educational Services	\$444,902	\$271,884	\$207,621	4
Healthcare & Social Services	\$2,852,315	\$1,720,287	\$1,280,328	18
Arts, Entertainment, etc.	\$375,695	\$202,677	\$118,640	4
Accommodation	\$439,958	\$281,771	\$123,584	2
Food Services, etc.	\$1,216,065	\$637,693	\$395,468	12
Other Services	\$1,838,927	\$1,038,104	\$711,843	12
Households	N.A.	N.A.	\$34,603	2
Total Annual	\$87,507,235	\$56,799,126	\$26,239,318	307

A1.9: NAICS 42393: Recyclable Material Merchant Wholesalers (\$2019)

	Output/Receipts	Value-Added	Earnings/Payroll	Jobs
Agriculture, etc.	\$38,765	\$19,383	\$9,691	1
Mining	\$310,121	\$213,208	\$58,148	1
Utilities	\$1,889,800	\$1,075,732	\$281,047	3
Construction	\$969,128	\$542,712	\$300,430	7
Durable Manufacturing	\$1,308,323	\$571,786	\$300,430	7
Nondurable Manufacturing	\$1,977,021	\$804,376	\$397,343	11
Wholesale Trade	\$102,010,419	\$69,176,361	\$30,420,930	516
Retail Trade	\$5,427,117	\$3,624,539	\$1,909,182	83
Transportation/Warehousing	\$3,295,035	\$1,870,417	\$1,162,954	35
Information	\$5,165,453	\$2,965,532	\$1,085,423	24
Finance & Insurance	\$8,586,475	\$4,332,002	\$2,238,686	53
Real Estate	\$13,936,061	\$9,759,120	\$2,161,156	108
Prof./Technical Services	\$7,006,796	\$4,583,976	\$3,013,988	61
Management of Companies	\$1,356,779	\$814,068	\$562,094	8
Admin./Waste services	\$4,225,398	\$2,791,089	\$1,909,182	77
Educational Services	\$872,215	\$533,020	\$407,034	18
Healthcare & Social Services	\$5,591,869	\$3,372,566	\$2,510,042	70
Arts, Entertainment, etc.	\$736,537	\$397,343	\$232,591	16
Accommodation	\$862,524	\$552,403	\$242,282	9
Food Services, etc.	\$2,384,055	\$1,250,175	\$775,302	49
Other Services	\$3,605,156	\$2,035,169	\$1,395,544	48
Households	N.A.	N.A.	\$67,839	8
Total Annual	\$171,555,049	\$111,352,814	\$51,441,317	1,212

A1.10: NAICS 4533: Used Merchandise Stores (\$2019)

	Output/Receipts	Value-Added	Earnings/Payroll	Jobs
Agriculture, etc.	\$46,557	\$18,623	\$9,311	0
Mining	\$325,896	\$260,717	\$65,179	1
Utilities	\$2,048,489	\$1,452,565	\$381,764	3
Construction	\$1,089,424	\$772,839	\$419,009	7
Durable Manufacturing	\$1,266,339	\$540,056	\$288,651	5
Nondurable Manufacturing	\$1,890,197	\$884,575	\$437,632	8
Wholesale Trade	\$3,957,309	\$3,147,225	\$1,387,386	16
Retail Trade	\$100,115,260	\$63,270,386	\$33,222,772	1,078
Transportation/Warehousing	\$1,927,442	\$1,554,990	\$977,688	21
Information	\$5,121,223	\$3,380,007	\$1,275,650	19
Finance & Insurance	\$8,259,137	\$4,497,365	\$2,346,451	39
Real Estate	\$15,810,613	\$13,780,746	\$3,007,555	106
Prof./Technical Services	\$5,335,384	\$4,506,677	\$2,867,885	40
Management of Companies	\$391,075	\$567,990	\$391,075	4
Admin./Waste services	\$3,091,357	\$2,681,659	\$1,806,395	51
Educational Services	\$986,999	\$651,792	\$502,811	15
Healthcare & Social Services	\$6,536,543	\$3,594,168	\$2,672,347	52
Arts, Entertainment, etc.	\$754,217	\$437,632	\$260,717	12
Accommodation	\$912,509	\$586,613	\$260,717	7
Food Services, etc.	\$2,560,612	\$1,303,584	\$810,084	35
Other Services	\$3,556,922	\$2,057,801	\$1,406,009	33
Households	N.A.	N.A.	\$74,491	6
Total Annual	\$165,983,504	\$110,022,500	\$54,871,580	1,559

A1.11: NAICS 562111: Solid Waste Collection (\$2019)

	Output/Receipts	Value-Added	Earnings/Payroll	Jobs
Agriculture, etc.	\$43,541	\$14,514	\$14,514	1
Mining	\$580,542	\$391,866	\$101,595	1
Utilities	\$2,641,467	\$1,494,896	\$391,866	4
Construction	\$1,262,679	\$711,164	\$391,866	7
Durable Manufacturing	\$6,487,560	\$2,728,549	\$1,393,301	25
Nondurable Manufacturing	\$2,714,035	\$1,088,517	\$493,461	10
Wholesale Trade	\$8,693,620	\$5,892,504	\$2,597,927	36
Retail Trade	\$7,996,969	\$5,355,502	\$2,830,143	99
Transportation/Warehousing	\$3,367,145	\$1,770,654	\$1,117,544	28
Information	\$6,473,046	\$3,671,930	\$1,277,193	21
Finance & Insurance	\$13,120,255	\$6,719,777	\$3,338,118	64
Real Estate	\$18,998,245	\$13,236,363	\$2,989,793	118
Prof./Technical Services	\$10,304,625	\$6,676,236	\$4,615,311	72
Management of Companies	\$1,567,464	\$943,381	\$653,110	8
Admin./Waste services	\$165,599,676	\$79,519,774	\$41,465,230	770
Educational Services	\$1,248,166	\$754,705	\$580,542	20
Healthcare & Social Services	\$7,924,402	\$4,774,960	\$3,555,821	80
Arts, Entertainment, etc.	\$1,146,571	\$624,083	\$362,839	21
Accommodation	\$2,002,871	\$1,262,679	\$566,029	17
Food Services, etc.	\$4,296,013	\$2,264,115	\$1,422,329	71
Other Services	\$6,197,288	\$3,584,848	\$2,452,791	63
Households	N.A.	N.A.	\$101,595	9
Total Annual	\$272,666,180	\$143,582,611	\$72,712,916	1,544

A1.12: NAICS 562112: Hazardous Waste Collection (\$2019)

	Output/Receipts	Value-Added	Earnings/Payroll	Jobs
Agriculture, etc.	\$1,906	\$981	\$635	0
Mining	\$25,414	\$17,155	\$4,447	0
Utilities	\$115,635	\$65,442	\$17,155	0
Construction	\$55,276	\$31,132	\$17,155	0
Durable Manufacturing	\$284,004	\$119,447	\$60,994	1
Nondurable Manufacturing	\$118,811	\$47,652	\$21,602	0
Wholesale Trade	\$380,578	\$257,954	\$113,729	2
Retail Trade	\$350,081	\$234,446	\$123,894	4
Transportation/Warehousing	\$147,402	\$77,513	\$48,922	1
Information	\$283,368	\$160,745	\$55,911	1
Finance & Insurance	\$574,361	\$294,169	\$146,132	3
Real Estate	\$831,680	\$579,444	\$130,883	5
Prof./Technical Services	\$451,102	\$292,263	\$202,043	3
Management of Companies	\$68,618	\$41,298	\$28,591	0
Admin./Waste services	\$7,249,400	\$3,481,110	\$1,815,209	33
Educational Services	\$54,641	\$33,038	\$25,414	1
Healthcare & Social Services	\$346,904	\$209,032	\$155,662	3
Arts, Entertainment, etc.	\$50,193	\$27,320	\$15,884	1
Accommodation	\$87,679	\$55,276	\$24,779	1
Food Services, etc.	\$188,065	\$99,115	\$62,265	3
Other Services	\$271,297	\$156,933	\$107,375	3
Households	N.A.	N.A.	\$4,447	0
Total Annual	\$11,936,413	\$6,285,566	\$3,183,128	66

A1.13: NAICS 56292: Materials Recovery Facilities (MRFs) (\$2019)

	Output/Receipts	Value-Added	Earnings/Payroll	Jobs
Agriculture, etc.	\$3,852	\$2,196	\$1,284	0
Mining	\$51,358	\$34,667	\$8,988	0
Utilities	\$233,679	\$132,247	\$34,667	0
Construction	\$111,704	\$62,914	\$34,667	1
Durable Manufacturing	\$573,927	\$241,383	\$123,260	3
Nondurable Manufacturing	\$240,099	\$96,296	\$43,654	1
Wholesale Trade	\$769,088	\$521,285	\$229,828	4
Retail Trade	\$707,458	\$473,779	\$250,371	12
Transportation/Warehousing	\$297,877	\$156,642	\$98,864	3
Information	\$572,643	\$324,840	\$112,988	2
Finance & Insurance	\$1,160,694	\$594,470	\$295,309	7
Real Estate	\$1,680,695	\$1,170,965	\$264,494	14
Prof./Technical Services	\$911,607	\$590,618	\$408,297	8
Management of Companies	\$138,667	\$83,457	\$57,778	1
Admin./Waste services	\$14,649,905	\$7,034,779	\$3,668,254	90
Educational Services	\$110,420	\$66,766	\$51,358	2
Healthcare & Social Services	\$701,038	\$422,421	\$314,569	9
Arts, Entertainment, etc.	\$101,432	\$55,210	\$32,099	2
Accommodation	\$177,186	\$111,704	\$50,074	2
Food Services, etc.	\$380,050	\$200,297	\$125,827	8
Other Services	\$548,248	\$317,136	\$216,988	7
Households	N.A.	N.A.	\$8,988	1
Total Annual	\$24,121,628	\$12,702,149	\$6,432,605	180

A1.14: NAICS 811211: Computer/Office Technology Repair (\$2019)

	Output/Receipts	Value-Added	Earnings/Payroll	Jobs
Agriculture, etc.	\$1,311	\$655	\$328	0
Mining	\$14,416	\$9,829	\$2,621	0
Utilities	\$86,169	\$49,146	\$12,778	0
Construction	\$43,248	\$24,245	\$13,433	0
Durable Manufacturing	\$206,411	\$96,653	\$45,542	1
Nondurable Manufacturing	\$78,633	\$31,126	\$14,416	1
Wholesale Trade	\$209,360	\$141,867	\$62,251	1
Retail Trade	\$277,836	\$185,443	\$97,636	6
Transportation/Warehousing	\$71,753	\$38,334	\$24,245	1
Information	\$263,748	\$153,007	\$50,784	2
Finance & Insurance	\$346,640	\$173,320	\$88,790	3
Real Estate	\$594,006	\$417,082	\$92,066	7
Prof./Technical Services	\$254,902	\$169,716	\$114,018	3
Management of Companies	\$33,419	\$19,986	\$13,761	0
Admin./Waste services	\$159,232	\$108,776	\$73,391	4
Educational Services	\$43,576	\$26,539	\$19,986	1
Healthcare & Social Services	\$288,648	\$174,303	\$129,744	5
Arts, Entertainment, etc.	\$32,108	\$17,037	\$10,157	1
Accommodation	\$42,920	\$27,194	\$12,123	1
Food Services, etc.	\$115,328	\$60,613	\$37,678	3
Other Services	\$3,473,938	\$2,261,680	\$1,737,788	54
Households	N.A.	N.A.	\$3,604	1
Total Annual	\$6,637,603	\$4,190,153	\$2,657,138	96

A1.15: NAICS 81143: Footwear and Leather Goods Repair (\$2019)

	Output/Receipts	Value-Added	Earnings/Payroll	Jobs
Agriculture, etc.	\$788	\$604	\$394	0
Mining	\$11,033	\$7,486	\$1,970	0
Utilities	\$65,407	\$37,432	\$9,850	0
Construction	\$32,704	\$18,519	\$10,245	0
Durable Manufacturing	\$66,983	\$29,157	\$15,761	0
Nondurable Manufacturing	\$85,896	\$32,310	\$15,367	0
Wholesale Trade	\$180,855	\$122,540	\$53,981	1
Retail Trade	\$242,716	\$159,972	\$84,320	4
Transportation/Warehousing	\$53,587	\$27,975	\$17,731	1
Information	\$167,064	\$95,747	\$33,492	1
Finance & Insurance	\$269,904	\$135,937	\$70,136	2
Real Estate	\$483,462	\$339,645	\$74,864	4
Prof./Technical Services	\$171,793	\$113,872	\$74,076	1
Management of Companies	\$35,856	\$21,671	\$14,579	0
Admin./Waste services	\$110,326	\$74,470	\$50,041	2
Educational Services	\$29,157	\$17,731	\$13,397	1
Healthcare & Social Services	\$192,282	\$115,842	\$86,290	2
Arts, Entertainment, etc.	\$23,247	\$12,609	\$7,486	1
Accommodation	\$29,946	\$18,913	\$8,274	0
Food Services, etc.	\$83,532	\$44,130	\$27,581	2
Other Services	\$4,058,010	\$2,689,185	\$1,089,859	35
Households	N.A.	N.A.	\$2,364	0
Total Annual	\$6,394,547	\$4,117,901	\$1,762,057	57



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